Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Cross-phase Modification: A mechanism for the I-mode and other enhanced confinement regimes?[1] DAVID NEWMAN, Univ. of Alaska Fairbanks, PAUL TERRY, Univ. of Wisconsin-Madison, RAUL SANCHEZ, A BUSTOS, Univ. Carlos III de Madrid, Madrid Spain — New confinement regimes such as the I-mode offer good confinement properties with reduced density limit issues and better control. Previously, a number of different mechanisms have been identified for the formation and maintenance of enhanced confinement regimes. However, few if any allow enhanced confinement in one channel but not another as is seen in the I-mode. We propose modifications of cross-phases as a possible mechanism for different transport in different channels. Using simple dynamical models which have been able to capture a remarkable amount of the dynamics of the core and edge transport barriers found in many devices, we add cross phase to investigate the new mechanism. To this basic 7 field transport framework a simple model for phase effects, due to multiple instabilities, between the transported fields such as density and temperature is added with which we can investigate whether the dynamics of more continuous transitions such as the I-mode can be captured and understood. It can. This is backed up by multi-scale simulations on full gyro-kinetic codes. We then look at the question: If this mechanism is valid, what can the model tell us about control knobs for these promising regimes?

[1]work supported by DOE grant DE-FG02-04ER54741

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Date submitted: 09 Jul 2016 Electronic form version 1.4